

(11) (A) No. 1093897

(45) ISSUED 810120

(52) CLASS 108-43

(51) INT. CL. ²E06B 1/28

(19) (CA) **CANADIAN PATENT** (12)

(54) WINDOW ASSEMBLY

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(21) APPLICATION No. 246,243

(22) FILED 760220

No. OF CLAIMS 9

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CCA-274 (3-80)

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ABSTRACT OF THE DISCLOSURE

The present invention provides a window assembly in which the window units may be removed and which incorporates safety features to prevent the accidental removal of the window unit. The construction of the window assembly is such that sash members and the window frame have interlocking flanges which require careful manipulation with respect to one another in order to release the window units from the window frame. The upper and lower sash members have flanges projecting outwardly therefrom in an overlapping relationship with respect to corresponding flanges formed in the header and sill whereby in order to remove the window units the lower sash member of each unit must be moved upwardly by a predetermined amount in order to release it for lateral movement with respect to the sill, whereupon the lower sash member of that unit may be moved laterally away from its associated sill side wall to withdraw its locking flange from its underlying relationship with respect to its associated sill flange and thereafter the window unit may be raised until the lower sash member is clear of the sill, whereupon the lower sash member may be moved laterally outwardly over the sill and the upper sash member may be withdrawn from the header by compressing the sash locking member inwardly of the header to release it from the upper sash member.

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This invention relates to window assemblies. In particular, this invention relates to a window assembly in which the window units may be removed.

PRIOR ART

Considerable difficulty has been experienced in attempting to provide window assemblies from which the window units may be removed while also providing adequate safety for the prevention of the undesired or unlawful removal of the window units. In many sliding window assemblies the window unit sashes are slidably mounted on guide rails and removed by raising the lower sash out of engagement with the lower guide rail and moving the lower sash outwardly over the lower guide rail. The principal action in the removal of window units of this type is the raising of the lower sash. It has been found that the lower sash may be accidentally raised out of engagement with the guide rail by the application of a direct force against the window pane with a result that the window assembly may be forced out of the window frame when an individual falls or leans heavily against the window pane. Furthermore, in these known devices the window units may be removed to permit unlawful entry by raising the lower sash out of engagement with its associated sill.

The present invention overcomes the above difficulties by providing a sash and frame construction which requires the window units to be moved inwardly in the direction away from their normal removal direction with respect to the frame before they may be removed from the frame. This is movement in a direction opposite to the direction in which a force would be applied to the window unit by an individual applying an outwardly directed force to the window unit.

SUMMARY

According to an embodiment of the present invention,

a window assembly consists of at least one window unit mounted in the frame, each window unit having an upper and lower sash member, the window frame including a header and a sill each having oppositely disposed side walls defining a header channel and a sill channel respectively, each of said channels opening inwardly of the frame and being adapted to receive the upper and lower sashes respectively of each window unit, a sash locking member mounted in said header channel and extending longitudinally thereof, said sash locking member being resiliently urged in a
10 direction outwardly of said header channel, the improvement of header flange means projecting transversely inwardly of the header channel from at least one of said side walls of the header, sill flange means projecting transversely inwardly of the sill channel from at least one of said side walls of the sill and underlying a header flange, first sash flange means projecting outwardly from the upper sash member of each window unit to overlap said header flange means, second sash flange means projecting outwardly from said lower sash member of each window unit to underlie said sill flange means, said sash
20 locking member and said upper sash member being adapted to releasably engage one another to prevent lateral movement of said upper sash member with respect to said header when said first sash flange means of said upper sash is in an operative position overlying said header flange means, said sash locking member being movable inwardly of said header channel to release said upper sash member, said sill and the lower sash member of each window unit being adapted to releasably engage one another to prevent lateral movement of the lower sash member with respect to said sill when said second sash flange is in a position underlying
30 said sill flange means, said lower sash member being movable upwardly to release said lower sash member for lateral movement with respect to said sill, whereupon said lower sash member may be moved laterally away from its associated sill side wall to withdraw

the second sash flange from its underlying relationship with the sill flange means and thereafter its associated window unit may be raised until its lower sash member is clear of the sill whereupon said lower sash member may be moved laterally outwardly over the sill and the upper sash member may be withdrawn from the header to thereby remove said associated window unit from the window assembly.

The invention will be more clearly understood after reference to the following detailed specification read in conjunction with the drawings wherein,

10 Fig. 1 is a pictorial view of a window assembly according to an embodiment of the present invention mounted in a window opening;

Fig. 2 is a sectional view along the line 2-2 of Fig. 1;

Fig. 3 is a sectional view of a sash illustrating the manner in which a window pane is mounted therein;

Fig. 4 is a sectional view along the line 4-4 of Fig. 1;

Fig. 5 is a sectional view along the line 5-5 of Fig. 1.

With reference to the drawings, the reference numeral 10 refers generally to a window unit according to an embodiment of the present invention. The window unit has a frame consisting of a sill 12, a header 14 and a pair of jambs 16. Each of the members
20 of the frame may be made from extruded plastic material such as a polyvinylchloride or the like.

The structure of the sill is illustrated in Fig. 2 of the drawings in cross-section. The sill consists of a horizontally extending bottom wall 18 and an angularly inclined bottom wall 20 spaced from one another by ribs 22.

One of the ribs 22 forms a front wall of the sill and has an extension 24 which is adapted to project into a slot 26 formed in the base 28. A similar extension 24a projects downwardly
30 from the inner edge of the bottom wall 18 into a similar slot 26a formed in the base member 28. The extensions 20 and 24 have small locking ribs projecting outwardly therefrom that serve to secure the extensions within the slots 26 and 26a. A pair of side walls 30 project outwardly from opposite sides of the sill member

to define a sill channel 32 therebetween. A pair of hook-shaped sill flange members 28 project inwardly and downwardly from the upper edge of the side walls 30. The bottom wall 18 of the sill has a pair of raised guide rails 36 extending longitudinally thereof. Each of the guide rails 36 has a side face 38 which is inclined upwardly and away from its associated side wall 30. The inclined faces 38 serve to guide the flange members of the sashes into and out of overlapping relationship with the flange member of the sill, as will be described hereinafter. The ridge 40 is
 10 located between the rails 38 and spaced inwardly thereof to provide a pair of locking channels 42 extending longitudinally of the sill.

As shown in Fig. 3 of the drawings, each window assembly 50 consists of a thermal window pane unit 52 bounded by a sash member 54. Each of the sash members 54 consists of a U-shaped channel portion 56 adapted to receive the edge of a window unit and to lock the edge of the window unit therein. A projection 58 extends outwardly from the outer edge of the sash members 54 and has a recess 60 at the outer edge thereof shaped to conform to the configuration of the guide rails 36 of the sill member. A
 20 short lip 62 projects downwardly from the inner edge of the sash and is adapted to fit in the close fitting relationship within the recesses 42 formed in the sill. A sash locking flange 64 projects laterally from the opposite edge of the projection 58 and has a short upwardly extending lug 66 at its outer edge.

As shown in Fig. 4 of the drawings, the header 14 consists of a pair of hanger members 70 which are secured in a recess 72 formed in the upper frame member 74. One of the hangers 70 has a flange 76 projecting outwardly therefrom in an overlying relationship with respect to the frame member 74 to form a weather seal
 30 therewith. The hangers 70 are secured with respect to the frame

members 74 in a conventional manner, such as by staples or the like. The hangers 70 each have header flanges 78 projecting inwardly of the channel 80 which is formed between the oppositely disposed hangers 70. The flanges 78 each have an upwardly directed portion 82 at the inner edge thereof.

10 A sash locking member 90 is located in the channel 80 formed between the hanger members 70. The sash locking member 90 consists of a bottom wall 92 and a composite spring web 94. The spring web 94 serves to urge the bottom wall 92 outwardly of the header assembly. The bottom wall 92 is formed with substantially the same contour as the upper wall of the sill 18 and has a pair of guide rails 36a located thereon and a spacer wall 40a is located therebetween. Channels 42a are located between the guide rails 36a and the spacer wall 40a. The guide rails 36a each have angularly inclined side faces 38a. The bottom wall 92 also has flange portions 96 at opposite edges thereof which project in an overlying relationship with respect to the hanger flange portions 78, 82 and prevent removal of the locking member from the channel 80.

20 As shown in Fig. 5 of the drawings, the channel members 16 each have a longitudinal opening 89 to receive the outer edges of the side sash members 54a and 54b. The side sash member 54a differs from the top and bottom sash members 54 in that it does not include the locking flange 64 but does include a shoulder 95 that serves to sealingly engage within the recess 89 formed in the jamb. The sash member 54b is the same as the sash member 54a with the addition of a hand engaging flange 97 which may be engaged to move the window unit 50 to the open position. Meeting rails 99a and 99b are located at the opposite side edges of the window units 50 and include overlapping sealing flanges 98 and resilient spring 30 members 100 which serve to urge the overlapping flanges 98 towards

one another into sealing engagement. Resilient seal members 102 are also provided to form a weather seal between the meeting rails. The meeting rail 99b has a narrow lip 104 projecting outwardly therefrom onto which the edge of the frame 106 of a screen member 108 may be secured in a conventional manner. A similar flange 104a is formed on the oppositely disposed sash 16 for securement to the opposite edge of the screen member.

Each of the jamb members 16 has a resilient flange 91 adapted to bear against the outer edge of the sash members 54a and 54b and a resilient flange 93 adapted to bear against a side edge of the sash members 54a and 54b so that the sash members 54a and 54b may be sealingly located within the jamb members 16.

In order to remove the window units 50 from the assembly 10, the sliding window unit or inner window unit is moved away from its associated jamb member to a position in which the meeting rails 96a and 96b are spaced one from the other. The inner window unit is then raised slightly, thereby elevating the upper sash locking member 90. The inner window unit 40 is raised to a height sufficient to release the flange 62 from the passage 42 in the sill member. The lower sash member 54 of the inner window unit is then moved inwardly and upwardly to move the sash locking flange 64 inwardly of the sill locking flange 28. The window unit 50 is then raised by further compressing the sash locking member 90 until the flange 64 of the sash member 54 is at a height above the locking flange 28 of the sill. Thereafter, the lower sash member 54 is moved outwardly over the flange 28. The upper sash locking member 90 is then manually compressed and raised out of engagement with the upper sash member 54 and the sash member 54 is moved inwardly and downwardly to move the flange 64 thereof out of its overlying relationship with respect to the flange 78 of the hanger member.

To remove the outer window unit 50, the screen member 108 is first removed and the outer window unit is moved out of engagement with its associated jamb 16. Thereafter, the outer window unit 50 is removed in the same manner as that described above with respect to the inner window unit.

From the foregoing description of the removal of the window units, it will be apparent that if an attempt is made to raise the lower edge of each window unit to a height sufficient to permit its removal from the main channel of the sill, the sash locking flange 64 will engage the sill locking flange 28 to prevent the removal of the window unit. Furthermore, if after raising the window units to the full extent permitted by the locking flanges the window unit is moved inwardly of the sill, the hook shaped ends of the locking flanges 64 and 28 will engage one another to prevent removal of the window units. Thus, it will be seen that the window units cannot be removed without careful manipulation thereof in a manner which cannot be readily duplicated by accidental application of forces to the window units and consequently the window assembly of the present invention

10
20 incorporates important safety features.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a window assembly consisting of a window frame and at least one window unit mounted in said window frame, said window unit having an upper sash member and a lower sash member, the window frame including a header member having oppositely disposed side walls defining a header channel and a sill member having oppositely disposed side walls defining a sill channel, each of said channels opening inwardly of the window frame and receiving the upper sash member and lower sash member respectively of said window unit, a sash locking member mounted in said header channel and extending longitudinally thereof, said sash locking member being resiliently urged in a direction outwardly of said header channel, the improvement of;

(a) a header flange projecting transversely inwardly of said header channel from a first of said side walls of the header member,

(b) a sill flange projecting transversely inwardly of said sill channel from a first of said side walls of the sill member, said sill flange being located below said header flange,

(c) a first sash flange projecting outwardly from the upper sash member of said window unit to overlap said header flange,

(d) a second sash flange projecting outwardly from the lower sash member of said window unit to underlie said sill flange,

(e) said sash locking member and said upper sash member being adapted to releasably engage one another to prevent lateral movement of said upper sash member with respect

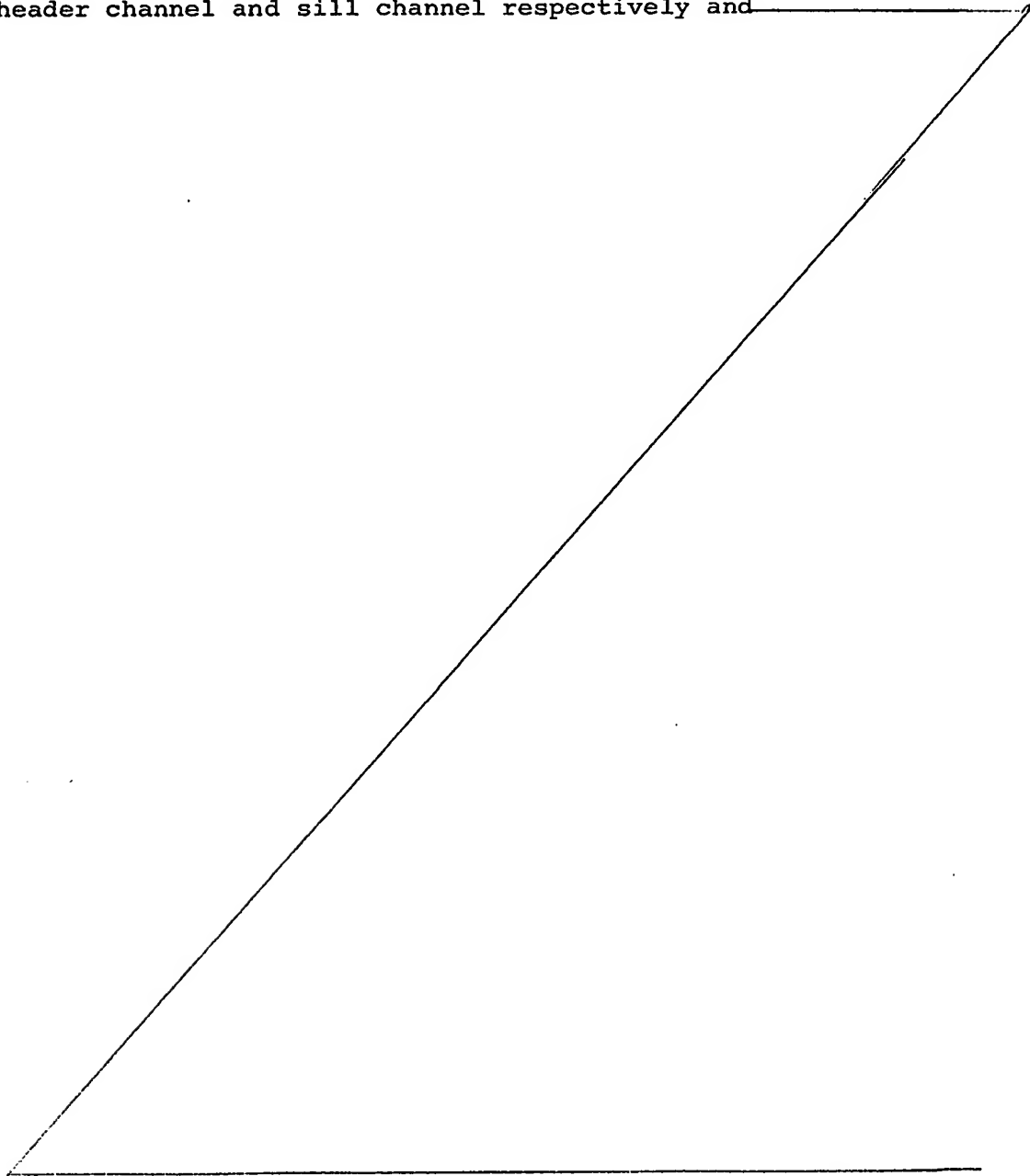
to said header when said first sash flange of said upper sash member is in an operative position overlying said header flange, said sash locking member being movable inwardly of said header channel to release said upper sash member.

(f) said sill member and said lower sash member being adapted to releasably engage one another to prevent lateral movement of said lower sash member with respect to said sill member when said second sash flange is in a position underlying said sill flange, said lower sash member being movable upwardly to be released for lateral movement with respect to said sill member whereupon said lower sash member may be moved laterally away from its associated sill side wall to withdraw said second sash flange from its underlying relationship with the sill flange and thereafter said window unit may be raised until its lower sash member is clear of the sill whereupon said lower sash member may be moved laterally outwardly over the sill member and said upper sash member may be withdrawn from the header member to thereby remove said window unit from the window frame.

2. A window assembly as claimed in Claim 1 wherein said first sash flange and said header flange have interlocking lip portions at the outer ends thereof which prevent direct lateral disengagement of said upper sash member with respect to the header member in response to movement of said upper sash member away from its associated side wall of said header member.

3. In a window assembly consisting of a window frame and a pair of window units, the frame consisting of a header member, a sill member and a pair of oppositely disposed jambs, the header member having oppositely disposed header side walls defining a header channel and the sill member having oppositely disposed sill side walls defining a sill channel, said header

channel and sill channel opening inwardly of the window frame, a sash locking member mounted in said header channel and extending longitudinally thereof, said sash locking member being resiliently urged in a direction outward of said header channel; each of the window units having an upper sash member and a lower sash member mounted in the header channel and sill channel respectively and



disposed adjacent opposite header side walls and sill side walls thereof, the improvement of;

(a) a header flange projecting inwardly of the header channel from each header side wall,

(b) a sill flange projecting inwardly of the sill channel from each sill side wall,

(c) a first sash flange projecting outwardly from the upper sash member of a first of said window units to overlap the header flange of the adjacent header side wall,

(d) a second sash flange projecting outwardly from the lower sash member of said first window unit to underlie the sill flange of the adjacent sill side wall,

(e) a third sash flange projecting from the upper sash member of the second of said window units to overlap the header flange of the adjacent header side wall,

(f) a fourth sash flange projecting outwardly from the lower sash member of the second window unit to underlie the sill flange of the adjacent sill side wall,

(g) said sash locking member being adapted to releasably engage the upper sash member of said first and second window units to prevent lateral movement of said upper sash members with respect to said header member when said first and second sash flanges are disposed in an operative position overlapping their associated header flanges, said sash locking member being movable inwardly of said header channel to release said upper sash members, said sill member being adapted to releasably engage the lower sash members of said first and second window units to prevent lateral movement of said lower sash members with respect to said sill member when said second and fourth sash flanges are operatively located in an underlying position with respect to their associated sill flanges, said lower sash

members being movable upwardly to release them for lateral movement with respect to said sill member whereupon the lower sash members may be moved laterally away from their associated sill side wall to withdraw said second sash flange and said fourth sash flange from their underlying relationship with respect to their associated sill flange such that thereafter said window units may be raised until said lower sash members are clear of the sill member whereupon said lower sash members may be moved laterally outwardly of said sill member and said upper sash members may be withdrawn from said header member to thereby remove said window units from said window frame.

4. A window assembly as claimed in Claim 3 wherein said sill member has a bottom wall extending transversely between said sill side walls, said bottom wall having first and second guide rails projecting upwardly therefrom and extending longitudinally thereof and arranged one adjacent each of said sill side walls, each of said lower sash members having an outer side edge formed to provide a rail receiving recess adapted to slidably engage one of said guide rails of said sill member and cooperating therewith to prevent lateral movement of said sash members with respect to said sill member.

5. A window assembly as claimed in Claim 4 wherein said sash locking member has a transverse wall extending transversely between said header side walls, said transverse wall of said sash locking member having first and second guide rails projecting downwardly therefrom and extending longitudinally thereof and arranged one adjacent each of said header side walls, each of said upper sash members having an outer edge formed to provide a rail receiving recess adapted to slidably engage one of said first and second guide rails and cooperating therewith to prevent lateral movement of said sash members with respect to one another.

6. A window assembly as claimed in Claim 5 wherein each of said first and second rails of said sill member and said first and second guide rails of said header has a side face directly opposite one of said side walls of the sill or header, said side face being inclined outwardly away from its associated side wall in a direction towards its associated sash member, said inclined face serving to guide each sash flange into and out of its overlapping relationship with its associated header flange or sill flange.

7. A window assembly as claimed in Claim 6 wherein the rail receiving recesses of said sash members are formed with angularly inclined side faces adapted to be located in a face-to-face relationship with the inclined side faces of said guide rails when said guide rails are in an operative position within said rail receiving recesses.

8. In a window assembly consisting of a window frame and at least one window unit mounted in said window frame, a first of said window units having an upper sash member and lower sash member, the window frame including a header member having oppositely disposed side walls defining a header channel and a sill member having oppositely disposed side walls defining a sill channel, each of said channels opening inwardly of the window frame and receiving the upper sash member and lower sash member respectively of said first window unit, the improvement of;

(a) a header flange projecting transversely inwardly of said header channel from a first of said side walls of the header member,

(b) a sill flange projecting transversely inwardly of said sill channel from a first of said side walls of the sill member and underlying said header flange,

(c) a first sash flange projecting outwardly from said upper sash member of said first window unit to overlap said header flange,

(d) a second sash flange projecting outwardly from each lower sash member of said first window unit to underlie said sill flange,

(e) means in said header channel for preventing direct lateral disengagement of said upper sash member with respect to said header in response to movement of said upper sash member away from its associated side wall of said header when said first sash flange of said upper sash member is in an operative position overlying said header flange,

(f) said sill member and said lower sash member being adapted to releasably engage one another to prevent lateral movement of said lower sash member with respect to said sill

member when said second sash flange is in a position underlying said sill flange, said lower sash member being movable upwardly to be released for lateral movement with respect to said sill member whereupon said lower sash member may be moved laterally away from its associated sill side wall to withdraw said second sash flange from its underlying relationship with the sill flange and thereafter said first window unit may be raised until said lower sash member is clear of the sill whereupon said lower sash member may be moved laterally outwardly over the sill member and said upper sash member may be released from said means for preventing direct lateral movement and may be moved laterally inwardly to remove said first sash flange from its overlying relationship with said header flange and thereafter said first window unit may be lowered to be withdrawn from the window frame.

9. A window assembly as claimed in Claim 8 wherein said means for preventing lateral movement of said upper sash member with respect to said header comprises, interlocking lip portions formed on said first sash flange and on said header flange.



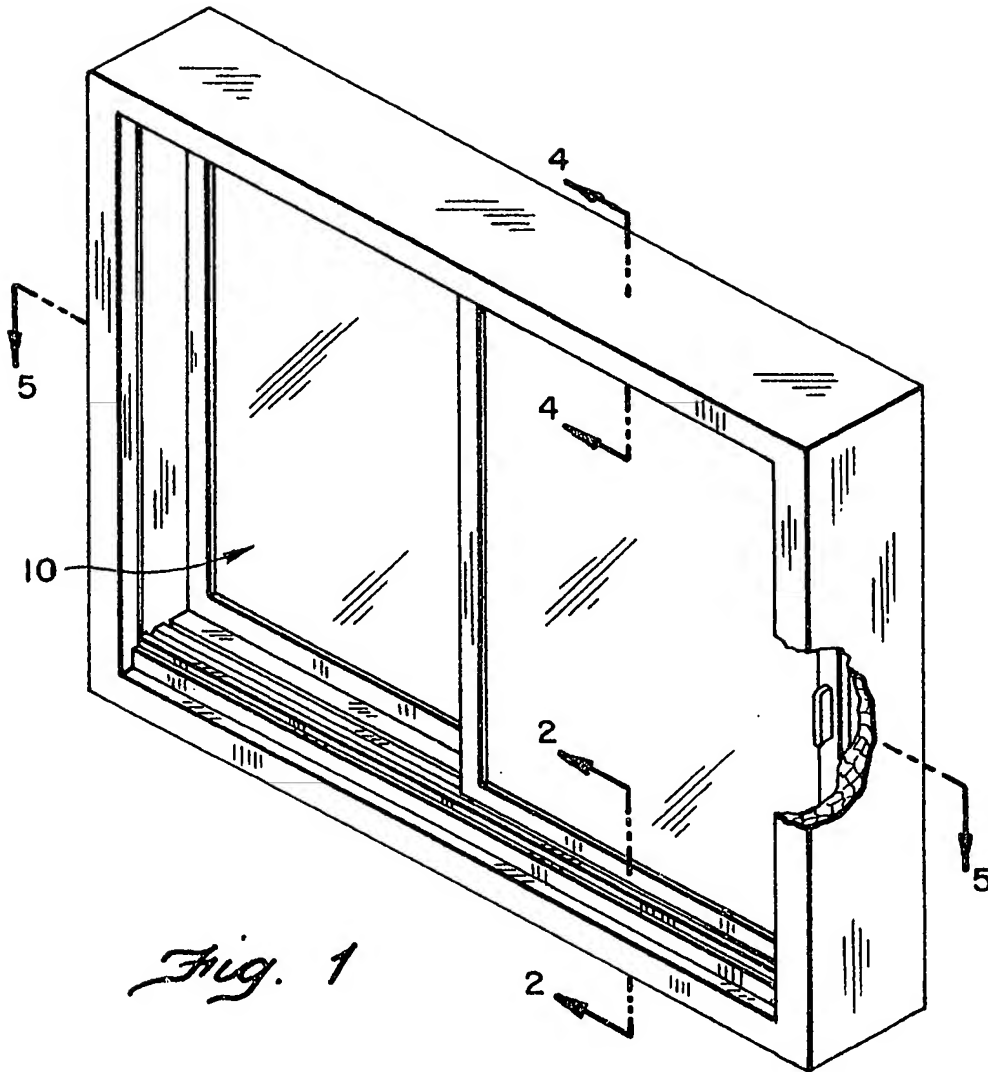


Fig. 1

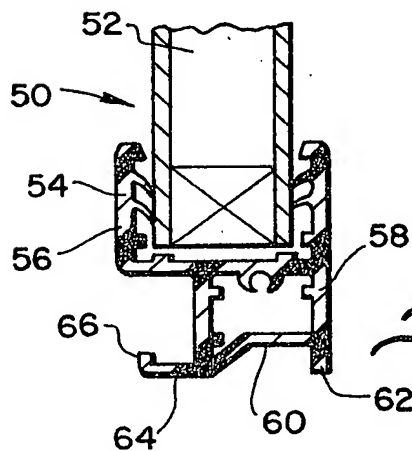


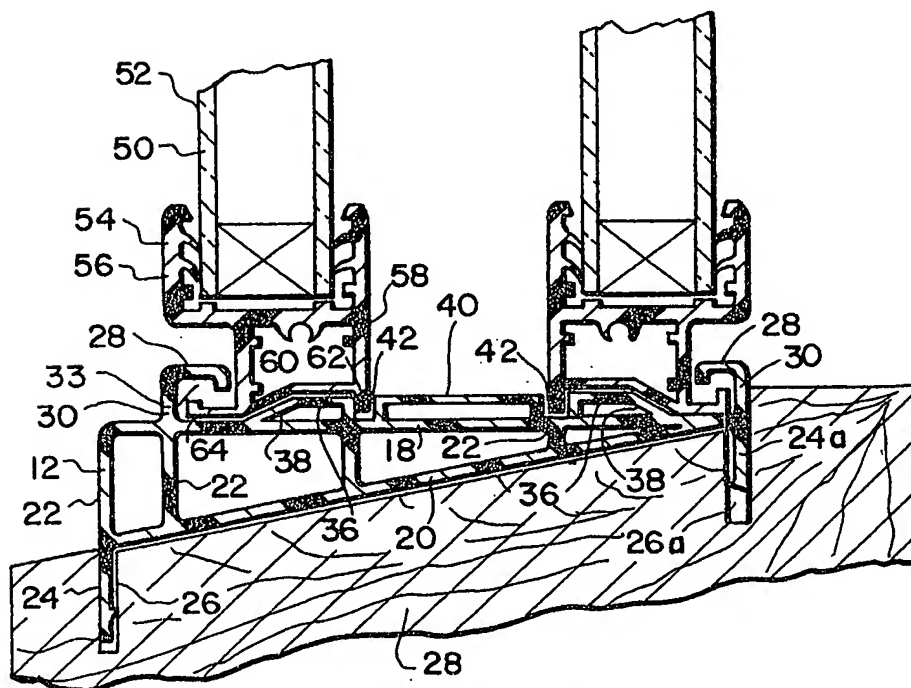
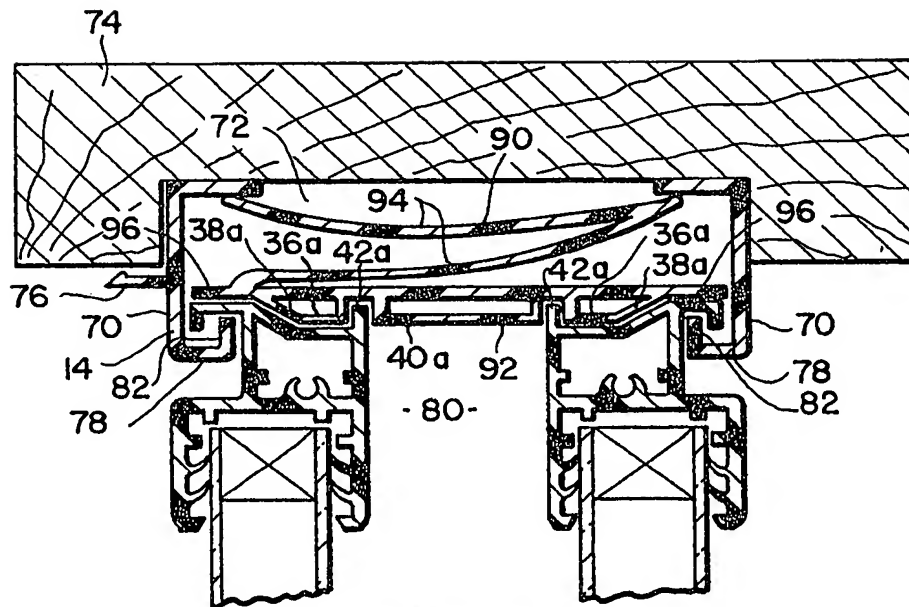
Fig. 3

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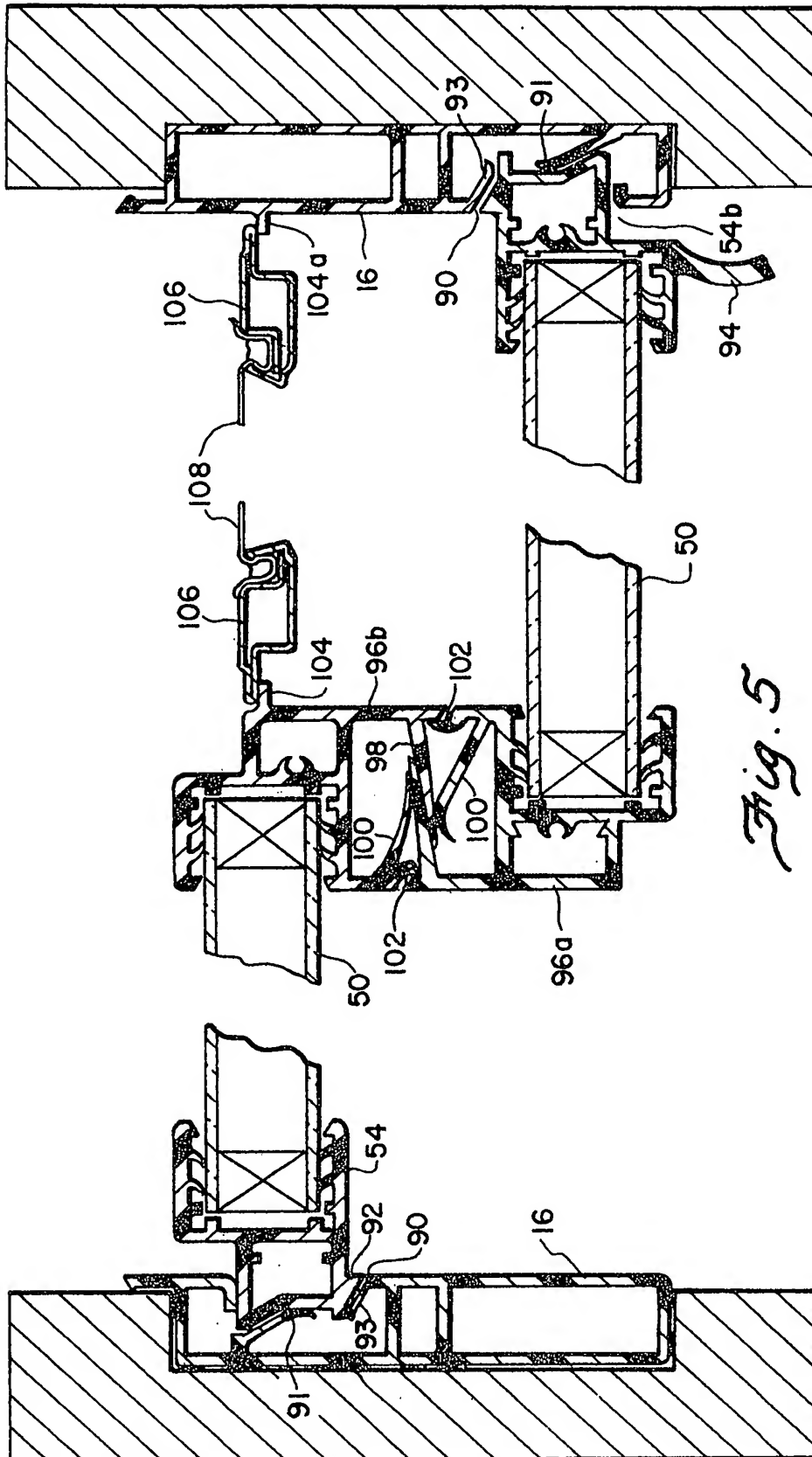


Fig. 5

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